

WHAT IS CLAIMED IS:

1. A filter apparatus comprising:

5 a main filter which has an input terminal and an output terminal and whose characteristics can be set by an external control signal;

a subordinate filter having substantially the same construction as that of said main filter;

10 a signal generator for generating a signal of a frequency equal to a cut-off frequency of each of said main filter and said subordinate filter and supplying it to said subordinate filter;

15 a phase difference detector for detecting a phase difference between the signal generated from said signal generator and an output signal of said subordinate filter and outputting a phase difference signal;

a reference signal generator for generating a reference signal corresponding to an ideal value of the phase difference detected by said phase difference detector; and

20 an error detector for detecting an error between said phase difference signal and said reference signal and supplying an error signal as said external control signal to said main filter and said subordinate filter.

25 2. An apparatus according to claim 1, wherein the ideal phase difference between the signal generated by said signal generator and the output signal of said subordinate filter is equal to  $90^\circ$  or  $-90^\circ$ .

3. An apparatus according to claim 1, wherein said

subordinate filter is a secondary active filter.

4. An apparatus according to claim 1, wherein said main filter and said subordinate filter are active filters.

5. An apparatus according to claim 1, wherein said  
5 phase difference detector is a multiplier.

6. An apparatus according to claim 5, further comprising compensating means for compensating a variation of said multiplier constructing said phase difference detector.

10 7. An apparatus according to claim 6, wherein said compensating means is a multiplier similar to the multiplier constructing said phase difference detector,

15 *Sub All* a predetermined value is generated by said multiplier constructing said compensating means, and and said predetermined value outputted from said multiplier constructing said compensating means is subtracted from an output of said multipliers constructing said phase difference detector and said subordinate filter is controlled by an output of said subtraction, thereby compensating a variation of characteristics of said phase difference detector constructed by said multiplier.  
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